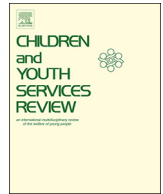




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Paid family leave and children health outcomes in OECD countries

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ABSTRACT

During the past four decades, most OECD (Organisation for Economic Co-operation and Development) countries have adopted or expanded paid family leave, which offers leave to workers following the birth or adoption of a child as well as care for ill family members. While the effects of paid maternity leave on child health have been the subject of a large body of research, little is known about fathers' leave-taking and the effects of paid paternity leave. This is a limitation, since most of the recent expansion in paid family leave in OECD countries has been to expand leave benefits to fathers. Mothers' and fathers' leave-taking may improve child health by decreasing postpartum depression among mothers, improving maternal mental health, increasing the time spent with a child, and increasing the likelihood of child medical checkup. The purpose of this paper is to examine the effects of paid family leave on the wellbeing of children, extending what we know about the effects of maternity leave and establishing new evidence on paternity leave. The paper examines the effects of paid family leave expansions on country-level neonatal mortality rates, infant mortality rates, under-five mortality rates, and the measles immunization rates in 35 OECD countries, during the time period of 1990 to 2016. Using an event study design, an approximately 1.9–5.2 percent decrease in the infant, neonatal, and under-five mortality rates has been found following the adoption of paid maternity leave. However, the beneficial impact is not as visible for extension of paid leave to fathers. The implications and potential reasons behind the larger protective effects of maternity leave over paternity leave on child health outcomes are discussed.

1. Introduction

Many OECD countries, except for the United States, have adopted paid family leave and a large body of literature has examined the effect of these leave policies on health outcomes for children. There is consensus that when workers do not have access to such leave they are less likely to accommodate the health needs of children, especially newborns (Clemans-Cope et al., 2008). Neuroscience and developmental research consistently show that the first two years of life are critical periods during which stable, responsive, warm caregiving is key to children's social, emotional, and intellectual development; a lack of these relationships contributes to stress and has life-long implications for health and development (Shonkoff & Phillips, 2000).

While the important role of caregivers during the neonatal period is clear, most research has examined the impact of employment leave after birth for mothers—with little to no work focusing on the impact of paid paternity leave on health outcomes of children. The impact of paid paternity leave is not nearly as discussed as the impact of paid maternity leave. This may be attributed to the recency of the availability of paid paternity leave in several countries. To address this gap, this study examines the separate effects of paid maternity and paternity leave policies on the health outcomes of children in OECD countries during the period of 1990 to 2016. Since paid paternity leave has been adopted following the implementation of paid maternity leave, there are no

countries with only paternity leave. Thus, when this study examines paid paternity leave, it is examining extensions to paid maternity leave. The health outcome measures that the study examines include: the neonatal mortality rate, infant mortality rate, under-five mortality rate, and the percentage of children receiving measles vaccination. The neonatal mortality rate is particularly important considering that 2.5 million newborns died within the first month of life in 2018, according to the World Health Organization (2019). This accounts for 47 percent of all children deaths under the age of five, which is an increase of 40 percent from 1990.

2. Background

Paid family leave allows workers to take time off from work with full or partial wage replacement to engage in family caregiving (Lester, 2005). For workers who are unable to take time off for financial reasons, paid family leave makes it affordable to do so. More importantly, paid leave helps retain female workers in the workforce, which is another purpose of paid family leave. According to economic theory, when women are guaranteed pay during the time they take leave and job protection, meaning when employees are guaranteed to return to their same job, it increases the likelihood that they will be in the labor force prior to having children. Also, it provides women the ability to plan for their future (Gupta, Smith, & Verner, 2008; Summers, 1989;

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Table 1
Paid family leave programs in OECD countries.

Country	Year Paid Maternity Leave Enacted	Maximum Length of Paid Maternity Leave as of 2018	Year Paid Paternity Leave Enacted	Maximum Length of Paid Paternity Leave as of 2018
Australia	2011	18 weeks	2013	2 weeks
Austria	Before 1990	16 weeks	None	0 weeks
Belgium	Before 1990	15 weeks	Before 1990	2 weeks
Canada	Before 1990	16 weeks (varies across provinces, from 15 to 18 weeks)	None	0 weeks
Chile	Before 1990	18 weeks	2005	1 week (5 working days)
Czech Republic	Before 1990	28 weeks	After 2016	1 week (7 calendar days)
Denmark	Before 1990	18 weeks	Before 1990	2 weeks
Estonia	2002	20 weeks	2002 (temporary suspended leave from 2009 to 2012)	2 weeks (10 working days)
Finland	Before 1990	17.5 weeks (105 working days)	1991	3 weeks
France	Before 1990	First or second child: 16 weeks; third or higher: 24 weeks.	2002	2 weeks
Germany	Before 1990	14 weeks	None	0 weeks
Greece	Before 1990	43 weeks (17 weeks basic maternity leave, and 26 weeks special maternity leave)	2000	0.4 week (2 days)
Hungary	Before 1990	24 weeks	2002	1 week (5 working days)
Iceland	Before 1990	13 weeks (3 months), embedded in parental leave scheme.	None	0 weeks
Israel	Before 1990	15 weeks	None	0 weeks
Ireland	Before 1990	26 weeks	After 2016	2 weeks
Italy	Before 1990	21.7 weeks	2013	0.8 week (4 days)
Japan	Before 1990	14 weeks	None	0 weeks
Korea	Before 1990	12.9 weeks	2008	1 week (5 working days)
Latvia	1995	16 weeks	2004	1.4 weeks (10 calendar days)
Luxembourg	Before 1990	20 weeks	Before 1990	2 weeks
Mexico	Before 1990	12 weeks	2012	1 week (5 working days)
Netherlands	Before 1990	16 weeks	2001	0.4 week (2 working days)
New Zealand	Before 1990	18 weeks	None	None
Norway	Before 1990	13 weeks	None	None
Poland	Before 1990	20 weeks	2010	2 weeks
Portugal	1995	6 weeks	1995	5 weeks
Slovak Republic	1993	34 weeks	None	None
Slovenia	2001	15 weeks	2003	4.3 weeks (30 calendar days)
Spain	Before 1990	16 weeks	Before 1990	4.3 weeks (30 calendar days)
Sweden	1995	12.9 weeks	Before 1990	1.4 weeks (10 calendar days)
Switzerland	2005	14 weeks	None	None
Turkey	Before 1990	16 weeks	2015	1 week (5 days)
United Kingdom	Before 1990	39 weeks	2003	2 weeks
United States	None	No weeks	None	None

Source: OECD Family Database (2019).

Sundström & Stafford, 1992).

Currently, 34 OECD countries offer paid family leave to parents. A detailed summary of the paid family leave programs in the OECD countries is shown in Table 1. Among these countries, 28 guarantee at least 14 weeks of paid family leave to mothers of infants. Coincidentally, 14 weeks of maternity benefits has also been recommended by the 2000 International Labor Organization's Maternity Protection Convention. The first 14 weeks is considered to be important because during this time period, infants begin to form neural connections and recognize the voice, smell, and face of their caregiver (Schulte et al., 2017). For example, in Australia, all workers, including full-time and part-time workers, have a guaranteed 18 weeks of paid parental leave at the federal minimum wage (Hewitt, Strazdins, & Martin, 2017). It should be noted that the United States offers 12 weeks of job-protected leave, but on an unpaid basis, for specified medical and family reasons through the Family Medical and Leave Act of 1993 (FMLA). Employees can use leave during the birth, adoption, or fostering of a child. It can also be used for serious health conditions that make an employee unable to perform their job and, similarly, it can be used to care for an employee's spouse, child, or parent who has a serious health condition.

2.1. Mothers' usage of paid leave

The type of maternity leave coverage provided is correlated to the amount of time that a new mother takes off from work (Berger, Hill, &

Waldfogel, 2005). When new mothers have access to paid leave, they are more likely to spend time at home with their newborns after giving birth (Rossin-Slater, Ruhm, & Waldfogel, 2013). For example, Baker, Gruber and Milligan (2008) analyzed maternity leave mandates in Canada, finding that mandatory leave entitlements increased the time that new mothers spent away from work by more than three months. Likewise, Baum and Ruhm (2016) used data from the 1997 cohort of the National Longitudinal Youth Survey to examine California's paid leave, finding that the usage of paid leave by mothers increased by three weeks following the birth of a child.

The literature also provides insights into the mechanisms through which additional time mothers spend with newborns yields health benefits. Paid leave may improve child health via an increased likelihood of breastfeeding. Research has found breastfeeding to be associated with improved child and maternal health (Hamdan & Tamim, 2012; Ip et al., 2007; Lichtman-Sadot & Bell, 2017; Pac, Bartel, Ruhm, & Waldfogel, 2019). Lichtman-Sadot and Bell (2017), who analyzed the longer-term effects of California's Paid Leave Program, found that paid parental leave increased the duration of breastfeeding from two to twelve weeks after childbirth. Likewise, Pac et al. (2019) analyzed the effect of California's Paid Family Leave Program and found that paid parental leave increased the overall duration of breastfeeding by nearly 18 days. Studies have demonstrated the medical benefits of breastfeeding on the health of mothers and children. Breastfed infants are less likely to develop asthma, ear infection, gastrointestinal infection,

childhood obesity, and type 1 and type 2 diabetes (Ip et al., 2007). Similarly, breastfeeding mothers, compared to non-breastfeeding mothers, are less prone to postpartum depression (Hamdan & Tamim, 2012).

Paid family leave is also associated with regular medical checkups at infancy, reduced prenatal stress, and reduced non-parental care during infancy. Lichtman-Sadot and Bell (2017), in particular, found the improvement in health outcomes are driven by children from low socioeconomic households, suggesting that the paid family leave program had the greatest effect on mothers who could not afford to take unpaid leave. Conversely, when mothers are pressured to return to work early, it can decrease the likelihood that newborns receive the needed care. Berger and Waldfogel (2004) found that children whose mothers returned to work within 12 weeks were 7.5 percentage points less likely to be breastfed, 2.4 percentage points less likely to receive baby-care, and 3.4 percentage points less likely to receive all of the required immunizations.

Paid maternity leave may also improve child health via an improvement in mental health of mothers, since paid maternity leave improves the quality of mothers' sleep, increases the frequency of children's medical checkups, and increases household income (Chatterji & Markowitz, 2012; Heymann et al., 2017; Stanczyk, 2019). Chatterji and Markowitz (2012) found that increasing the length of leave to over 12 weeks will reduce the maternal depressive symptoms on the CSED (Center for Epidemiologic Depression) scale by 15 percent and the probability of being classified as severely depressed by 2 percent. Likewise, as Mandal (2018) found, the negative psychological effects of returning to work early after giving birth was alleviated when women received paid maternity leave. Specifically, among women who returned to work within 12 weeks of childbirth, those who had received some paid family leave had a lower CSED score, compared to those who did not receive any paid family leave.

2.2. Fathers' usage of paid leave

While we know a good bit about maternity leave, we know less about paternity leave. We do know that fathers are somewhat less likely to take leave from their jobs but are more likely to do so when the leave is paid. For example, Cools, Fiva, and Kirkebøen (2015) analyzed the adoption of paid paternity leave in Norway in 1993 and found that the share of men taking paternity leave increased significantly, compared to the time period before adoption of the mandate. In fact, in 1993, the share of men taking paternity leave was 24.6 percent and by 2006, it was 60 percent (Cools et al., 2015). Similarly, Marshall (2008) found that after Canada extended the Parental Benefits Program from 10 to 35 weeks in 2001, the proportion of fathers filing for parental leave benefits increased by approximately 10 percent.

Some evidence from the literature is suggestive of mechanisms, as well. Paid parental leave appears to increase the likelihood that fathers are involved with the care of their children. Tanaka and Waldfogel (2007), who examined paid parental leave in the United Kingdom, found that fathers who took paid parental leave were 19 percent more likely to feed their child as well as 19 percent more likely to attend their newborn at night. When looking at Sweden's paternity leave program, Haas and Hwang (2008) also found a positive correlation between paternity leave and the participation of fathers in child care. Fathers who took more days of leave were more likely to spend time with their child and participate in child care tasks (Haas & Hwang, 2008). The lengthened interaction that fathers have with their children has demonstrated to be beneficial. Such strong interactions can have positive effect on the cognitive and physical development of children (Allen & Daly, 2007). The infants of highly involved fathers, on average, are more cognitively developed at six months of age (Pedersen, Rubenstein, & Yarrow, 1979).

Like paid maternity leave, paid paternity leave may also improve the health of children via an improvement in the health of mothers.

Persson and Rossin-Slater (2019), who examined Swedish households, found that increased paternity leave improves maternal mental health. Specifically, the study found that in the first six months after birth, paid paternity leave is correlated with a 14 percent decrease in the likelihood of a mother having an inpatient or specialist outpatient visit for child-birth related complications, a 26 percent decrease in the likelihood of a mother having anti-anxiety medication, and an 11 percent reduction in the likelihood of a mother having an antibiotic prescription drug. Bratberg and Naz (2009) found that Norway's paid paternity leave program reduced the sick absence rate of mothers who had recently given birth. Tikotzky et al. (2015) also found that greater paternal involvement, which may be encouraged by paternity leave, is associated with greater maternal sleep at six months after birth.

2.3. Paid parental leave and child health outcomes

Overall, there is good evidence that the increased time that both mothers and fathers have been afforded by paid parental leave has improved the health outcomes of children. One important indicator is the immunization rate of children. There is a general consensus that paid parental leave increases the likelihood of vaccination, since parents have more time to take their children to the doctor. A study of 185 countries found that a 10 percent increase in the number of weeks of paid maternity leave is associated with a 25.2 and 22.2 percent increase in measles and polio vaccinations, respectively (Daku, Raub, & Heymann, 2012).

Studies also indicate that paid parental leave reduces the mortality of infants, which may partially be a result of immunizations. For instance, Winegarden and Bracy (1995) found that each week of paid maternity leave was associated with a decrease of approximately 0.5 deaths per 1000 live births in 16 OECD countries (Winegarden & Bracy, 1995). Similarly, Ruhm (2000), using annual aggregate data for 16 European countries from 1969 to 1994, found that paid parental leave decreased the mortality of infants and young children. More specifically, a 10-week increase in parental paid leave was correlated with a 3.3–3.5 percent reduction in child mortality and a 2.5–3.4 percent reduction in infant mortality (Ruhm, 2000). Tanaka (2005) estimated that a 10-week increase in paid parental leave would also reduce infant mortality by 2.6 percent.

3. Contribution

The previous literature on paid family leave provides evidence of benefits for child health, but much remains unclear. First, it is unclear whether the effect of paid maternity leave policies on child health outcomes provide reasonable approximation of the effects of paternity leave policies as well. Second, much of the work on maternity leave examined reforms implemented in the 1980s. It is unclear whether the conclusions would change when taking into account more recent years, specifically from 1990 to 2016. This time period is particularly important, since this is the period when many OECD countries extended or expanded paid leave to fathers, as demonstrated by Fig. 1. This reflects changing gender attitudes in that many countries began to understand the importance of the role fathers play in the development of a child. As in Fig. 2, most countries had adopted paid maternity leave prior to 1990. Finally, studies such as Cools et al. (2015) and Marshall (2008) primarily analyzed the effect of paid family leave for a specific country. The results from one country may not be applicable to another country given differing economic and political structures. By conducting a cross-country analysis with the use of recent data, which takes paid paternity leave into consideration, this study would fill in a gap in the literature.

4. Hypothesis

When paid family leave is available, it is expected that access to such leave has an impact on the health of children, considering paid

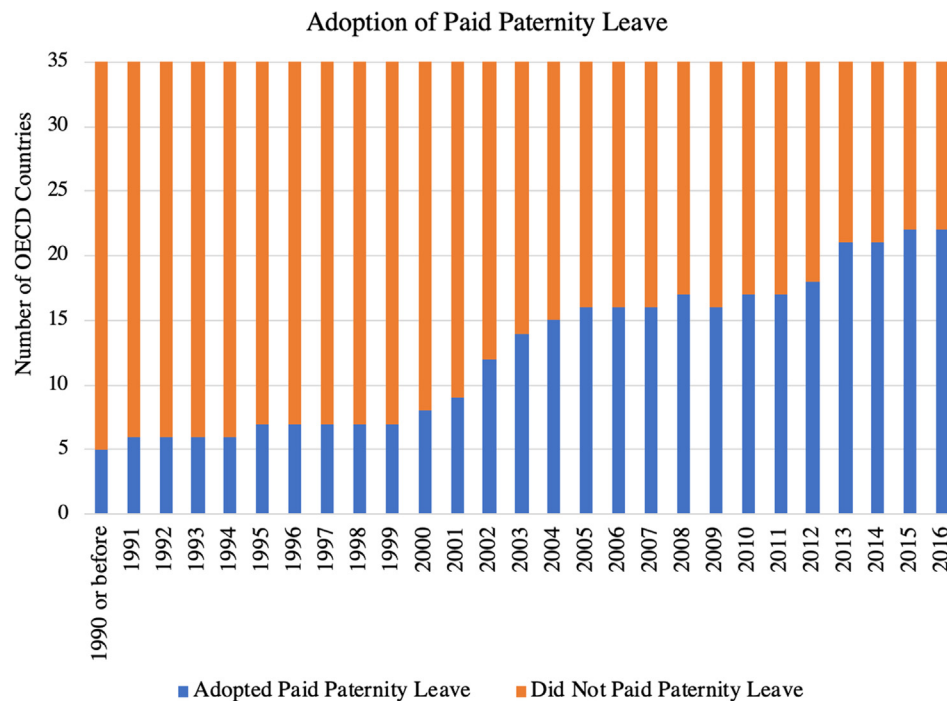


Fig. 1. Adoption of paid paternity leave.
Source: [OECD Family Database, 2019](#)

family leave has been demonstrated to decrease postpartum depression among mothers, improve maternal mental health, and increase the rate of breastfeeding (Chatterji & Markowitz, 2012; Hamdan & Tamim, 2012; Lichtman-Sadot & Bell, 2017; Pac et al., 2019; Persson & Rossin-Slater, 2019). In particular, it is hypothesized that paid family leave decreases the neonatal and infant mortality, since research has found that the time that parents spend with their child during that period of a child's life is important for a child's cognitive, social, and emotional development (Bernal, 2008; Kavanaugh et al., 1997; Schulte et al., 2017).

Paid family leave can be argued to be lifesaving during infancy, since about 3500 infants die in their sleep every year from accidental suffocation or unknown causes, known as sudden infant deaths or SIDs (Sole-Smith, 2016). Research appears to suggest that infants are better off when they are taken care of by a parent rather than by a child care provider, since there is a correlation between infants placed in child care and SIDs (Moon, Patel, & McDermott-Shaefer, 2000; Moon, Sprague, & Patel, 2005; Sole-Smith, 2016). Approximately one-third of SIDs-related deaths occur in the first week that an infant spends time in child care, with half of the deaths occurring on the first day (Sole-

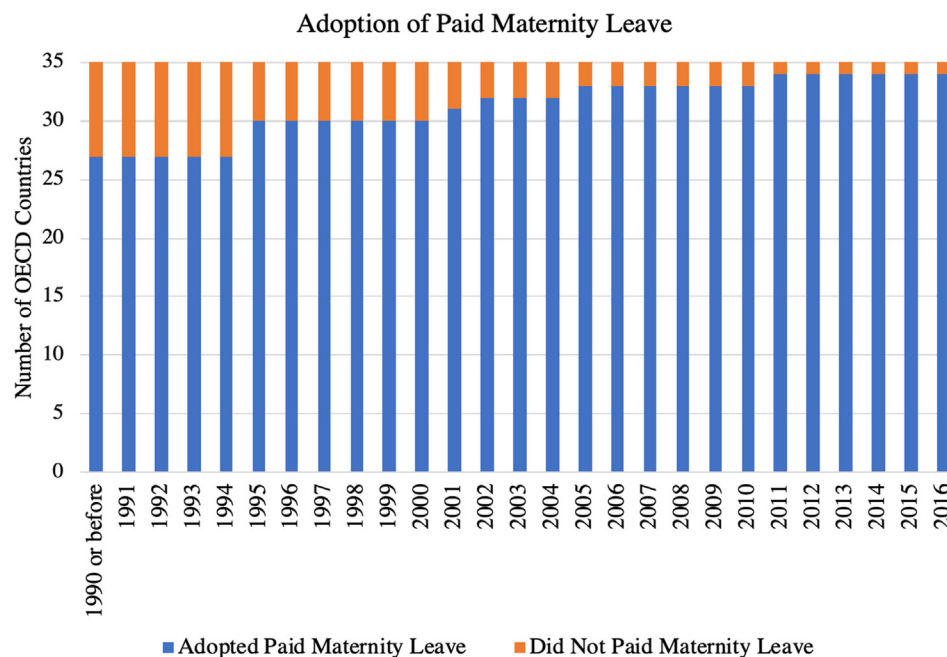


Fig. 2. Adoption of paid maternity leave.
Source: [OECD Family Database, 2019](#)

Smith, 2016). Among infants who died of SIDs in child care, 17.7 percent were cared by a licensed day care center, 21.3 percent were cared by a relative, and 54.4 percent were cared by a babysitter or homecare provider (Moon et al., 2005). The problem with babysitters or homecare providers is that many of these service providers are unlicensed and have not received education or training in handling infants. For example, day care providers are more likely to put babies on their stomach, since it can help them to go to asleep faster (Moon et al., 2005). However, this is a dangerous practice, considering it can increase the risk of SIDs. According to Alison Jacobson, the CEO of First Candle, which is a nonprofit organization that raises awareness of SIDs, “the longer that a mom or dad can stay home with a baby, the better.” Thus, paid family leave can prevent infancy death, since it allows parents to care for their newborns with an extensive amount of care, affection, and precision.

Additionally, it is expected that paid family leave decreases the under-five mortality rate, since research has shown that parents who have paid family leave are more likely to take their child for a medical checkup, spend additional time with their child, and are more likely to have more household resources that can be spent on the needs of the child (Heymann et al., 2017; Rossin-Slater et al., 2013; Stanczyk, 2019; Tanaka & Waldfogel, 2007). When a child receives a medical checkup, they are more likely to receive their scheduled vaccination. It is estimated that that 42,000 deaths are prevented every year among children who receive their recommended childhood vaccinations, according to the National Prevention Council (2011).

The hypotheses discussed above are summarized as follows:

H₁: Paid family leave decreases the neonatal and infant mortality.

H₂: Paid family leave decreases child (under-five) mortality.

The theoretical framework for this study is shown in Fig. 3.

5. Data Source

This study uses country-level panel data on 35 OECD countries from 1990 to 2016. The dataset is balanced, meaning the data uses the same number of countries for each year. The dataset was obtained from several publicly available sources, including the McGill University's

PROSPERED project, OECD Family Database, the World Bank Group, and the U.S. Central Intelligence Agency. The unit of analysis is country-year. In total, there are 945 country-year observations.

The primary independent variables of interest in this study are dummy variables measuring paid family leave. Paid maternity leave and paternity leave are distinguished, and have separate treatment indicators for country-years. Countries that never had paid maternity/paternity leave during this time period are coded as zero, whereas countries that always had paid maternity or paternity leave or later adopted such leave are coded as one.

To measure the health outcomes of children, the neonatal mortality rate, infant mortality rate, under-five mortality rate, and the measles immunization rate are used as dependent variables in this study. These health outcomes are consistent with other studies (Daku et al., 2012; Winegarden & Bracy, 1995). The neonatal mortality rate is particularly important considering more than one third of all child deaths occur within the first month of life, according to the World Health Organization. The mortality rate and the measles immunization rate are logged because they have a positively skewed distribution, as shown in Fig. 4.

Several annual country-level controls are included to account for country-level differences, which are found to impact the health of children. Specifically, the analysis controls for other health, socio-economic, environmental, and infrastructure factors, including the prevalence of anemia among women and the labor force participation rate of women. Each of these factors are arguably justified to be included in the analysis. First, expenditure factors, such as health expenditure of countries (percent of GDP), the public spending on family benefits (percent of GDP), and the gross national income (current U.S. dollars) is controlled for in the analysis, since they are found to be positively associated with the health outcomes of children (Ruhm, 2000). When countries invest more in the overall health of their citizens, there is an improvement in their health. Second, the prevalence of anemia among pregnant women has been controlled, since women who are in poor health conditions are more likely to have birth-related problems. Third, environmental factors such as the amount of carbon dioxide (CO₂) emissions and renewable electricity output were included in the analysis, since 1.7 million deaths in children under-five were attributable to the environment, according to the World Health Organization. Pollution has been cited to be a major contributor to childhood deaths, and thus, it is important to control for CO₂ emissions (Glinianaia et al., 2004). Finally, infrastructure factors, such as the, telephone subscription and the percent of individuals using internet, were also included since these can be considered critical modes of access to information relating to children's health (Martínez-Fernández et al., 2015). Finally, population size is also controlled in the analysis. Table 2 includes the summary statistics of the variables.

6. Methodology

To estimate the impact of paid family leave on child health outcomes, a two-way fixed effects model has been used. As Goodman-Bacon (2018) demonstrates, the coefficient of a two-way fixed effects model is equal to the “weighted average of all possible simple difference-in-difference that compares one group that changes treatment status to another group that does not.” The following two-way fixed effects model was estimated.

$$Y_{c,t} = Treatment_{c,t-2} + Treatment_{c,t-1} + Treatment_{c,t} + Treatment_{c,t+1} + Treatment_{c,t+2} + \beta_2 X_{c,t} + \tau_c + \omega_{c,t} + \epsilon_{c,t}$$

The indices, *c* and *t* are, respectively, country and year, and refer to the dummy variable, indicating whether country *c* has paid maternity leave or paid paternity leave in year *t*. The two lead variables, $Treatment_{c,t-2} + Treatment_{c,t-1}$, respectively refer to two years and one

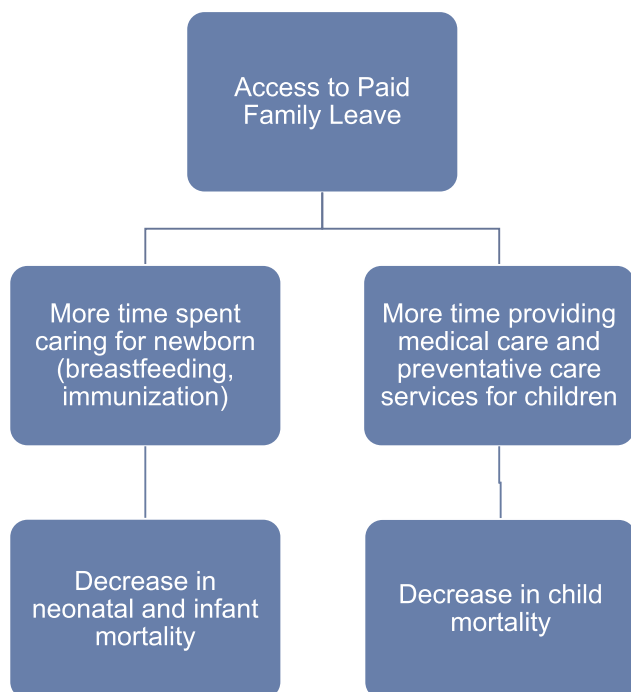


Fig. 3. Theoretical framework of the study.

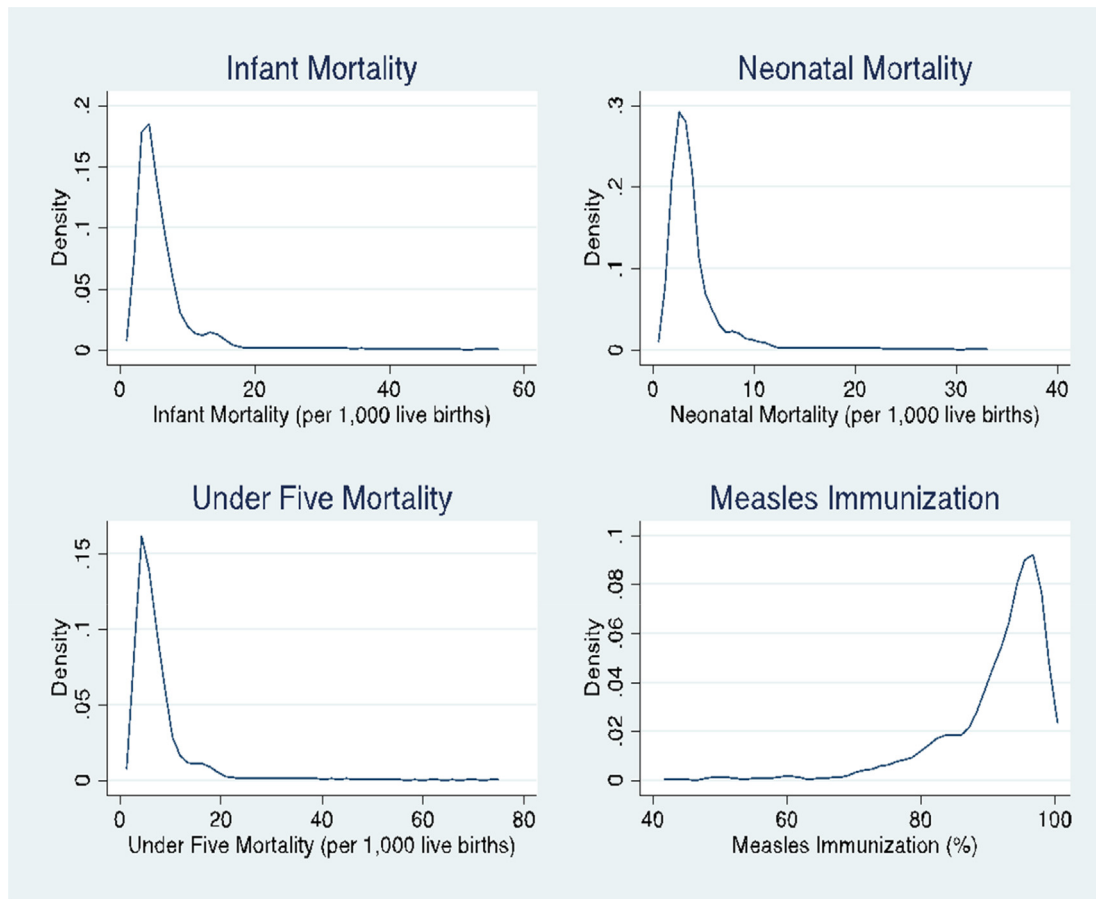


Fig. 4. Distribution of dependent variables.

year before the adoption of paid family leave in country c in year t . The two lagged variables, $Treatment_{c,t+1} + Treatment_{c,t+2}$, respectively, refer to one year and two years after the adoption of paid family leave in country c in year t . Furthermore, X_{ct} is a set of control variables, such as health expenditure of countries (percent of GDP), public spending on family benefits (percent of GDP), gross national income (current U.S. dollars), life expectancy, prevalence of anemia among pregnant women, labor force participation rate of women (percent of female population, ages above 15), CO₂ emissions (kt), fixed telephone subscription (per 100 people), the percent of individuals using internet (percent of population), and population size.

Furthermore, τ_c and $\omega_{c,t}$ are country-fixed effects and country-specific time trends, respectively. The benefit of controlling for country fixed effect is that it accounts for country-level characteristics that do not vary over time. However, the disadvantage of controlling for country-fixed effects is it only identifies countries that change over time. Country-fixed effects exploit within-country variation, meaning the results are only applicable to countries that have changed their status over time in terms of their paid parental leave policies. In this study, there is within-country variation since there are countries that initially did not have any paid parental leave policy, but later adopted maternity and/or paternity leave. Specifically, 17 OECD countries

Table 2
Summary statistics.

Variables	(1) Observations	(2) Standard Deviation	(3) Mean	(4) Minimum	(5) Maximum
Paid Maternity Leave (Treatment)	945	0.309	0.893	0	1
Paid Paternity Leave (Treatment)	945	0.481	0.361	0	1
Length of Paid Maternity Leave (Weeks)	945	7.921	14.921	0	43
Length of Paid Paternity Leave (Weeks)	945	0.937	0.546	0	4
Infant Mortality (Logged)	945	0.573	1.669	0.470	4.018
Neonatal Mortality (Logged)	945	0.559	1.241	-0.105	3.487
Under 5 Mortality (Logged)	945	0.565	1.860	0.742	4.307
Measles Immunization (Logged)	931	0.101	4.509	3.761	4.595
Health Expenditure (% of GDP)	911	2.142	7.845	2.448	17.21
Family Benefits Public Spending (% of GDP)	899	1.023	1.919	0	4.454
GNI (current US dollars)	909	2.284e + 12	9.722e + 11	5.472e + 09	1.905e + 13
Female Labor Force Participation Rate	945	4.443	43.84	26.05	50.63
Prevalence of Anemia Among Pregnant Women (%)	945	4.651	24.86	11.70	39.60
CO ₂ Emissions (kt)	862	906,283	346,033	1767	5.790e + 06
Individuals Using the Internet (% of the population)	920	33.67	42.10	0	98.24
Fixed Telephone Subscription (per 100 people)	945	2.868e + 07	1.433e + 07	130,472	1.925e + 08

adopted paid paternity leave during this period, as demonstrated in Fig. 1, and 7 OECD countries adopted maternity leave during this period, as demonstrated in Fig. 2.

The benefit of controlling for country-specific time trends is that it controls for changes within a country over time that may be associated with the implementation of parental leave policies. For example, it may be that countries with atypical growth rates in child health trends are more or less likely to implement paid parental leave policies. Country-specific time trends limit the threats to validity that are due to underlying health trends which may be contemporaneous with changes in leave policies. In contrast, common year trend assumes that all countries experience a common trend in a given year. The regressions with the common year trend can be found in Appendix A and Appendix B. However, it does not account for other changes within a country that may be driving the estimates downward or upward, which could potentially bias the estimates.

Furthermore, $\varepsilon_{c,t}$ is an error term, assumed to be independent and identically distributed (i.i.d.). Observations are unweighted. A Breusch-Pagan test finds no evidence of heteroscedasticity (Solon, Haider, & Wooldridge, 2013). Since there is no evidence of heteroscedasticity, the standard errors are not clustered by country in this analysis. Further, a country-level panel data has been used with no attempt to draw inference for a super population. Estimates are weighted when the impact of treatment is heterogeneous. It is reasonable to expect that weighting would ensure that certain segments of the population are represented. Yet, as Solon et al. (2013) demonstrate, simply weighting the estimates by the population share of a particular attribute or characteristic will not yield the population averaged treatment effect. Instead of weighting, Solon et al. (2013) suggest that a regression model should include dummies for each characteristic and a set of interaction terms with treatment. Thus, in this study, rather than weighting by population size, it is controlled for in the model. Finally, the results have been clustered by country to minimize standard errors.

In an additional layer of analysis, this study also examines the effect of the length of paid maternity and paternity leave on child health outcomes. This is important to examine, since there is substantial variation in the length of leave across countries and over time. It is possible that longer leave is associated with better health outcomes.

7. Results

The results indicate that after two years of the adoption of paid maternity leave, there is a statistically significant decrease in neonatal mortality, infant mortality, and under-five mortality (Table 3). Paid maternity leave is associated with a 5.2 percent decrease in the neonatal mortality rate, a 2.4 percent decrease in the infant mortality rate, and 1.9 percent decrease in the under-five mortality rate after two years of adoption, when accounting for country-specific time trends. Such effects are relatively large, when considering the size of the population being affected. For example, a 2.4 percent decrease in the infant mortality rate means the number of infants dying would drop from 10 to 9.76 per thousand live births. These results are relatively similar to those found by Ruhm (2000) and Tanaka (2005). Ruhm (2000) finds that a 10-week extension in paid family leave reduces infant mortality by 2.5 percent. Tanaka (2005) also finds that a 10-week extension in job-protected paid leave decreases infant mortality by 2.6 percent. In this analysis, a similar trend does not appear to hold true following the adoption of paid paternity leave, meaning that there is a not a statistically significant decrease in the child health outcomes (Table 4).

When examining the effect of the length of leave, the study finds that a one-week increase in paternity leave reduces the infant and under-five mortality (Table 6). However, longer length of paid maternity leave does not have a significant impact on child health outcomes (Table 5).

The variables controlled in this study also provide insight into the results. In all of the analyses (Table 3, Table 4, Table 5 and Table 6), it

was found that an increase in health expenditure is associated with a decrease in neonatal mortality, infant mortality, and under-five mortality. It was also found that an increase in the prevalence of anemia among pregnant women is associated with an increase in these three child health outcomes (Table 3, Table 4, Table 5, and Table 6).

8. Discussion

As the results suggest, paid maternity leave is correlated with a significant decrease in the neonatal, infant, and under-five mortality rate, which was expected. This supports the first hypothesis and partially supports the second hypothesis of the study. However, the impacts of paid maternity leave on the mortality rates are not immediate. The effects are not seen until two years after the adoption of the leave policy. This may be as a result of roll-out delays or compliance lags. Governments need to increase the awareness of such leave to individuals who are eligible for the program. Schuster et al. (2008), who examined the implementation of California's paid family leave program, corroborates the lack of awareness among individuals. This study found that within one year of the implementation of California's paid family leave program, parents with children of special health care needs who were receiving care at California hospitals were generally unaware of the program and rarely utilized it. Appelbaum and Milkman (2011) also found that there was a general lack of awareness of California's paid family leave program. Based on the survey utilized in the study, low-wage workers, immigrants, and Latinos were the least likely to be aware of the program (Appelbaum & Milkman, 2011).

In general, the impact of paid paternity leave was not as visible as that of paid maternity leave. It is possible that it takes some years to observe a measurable impact of any policy, which is apparent here in the case of paid family leave. Paid maternity leave has been in place in many countries for many years, but paid paternity leave is relatively new even in those countries that had paid maternity leave for many years. Paid maternity leave was available in 27 of the 35 OECD countries even before 1990, which rose to 32 countries in 2004 and then to 34 countries by 2016 (Fig. 2). In contrast, paid paternity leave was available only in nine OECD countries before 1990 and incrementally rose to 22 in 2016. During the time period of 2004 to 2016, countries with paid paternity leave increased from 15 to 22 (Fig. 1). Thus, it is clear that it has taken quite some time for paid paternity leave to be accepted and adopted and even after so many years its acceptance and adoption is not as much as of paid maternity leave.

The magnitude of the benefit available also has an impact on the beneficial outcomes. As Table 6 demonstrates, a one-week increase in the length of paid paternity leave reduces the infant and under-five mortality. The reason that length of paid paternity leave has a significant effect is that the length of paid paternity leave offered is much smaller than that of paid maternity leave. The average paid paternity leave available in the OECD countries is about 0.6 weeks compared to about 15 weeks of paid maternity leave (Table 2). Thus, increasing paid paternity leave from one to two weeks may have a larger impact, compared to increasing paid maternity leave from 12 to 13 weeks. It is possible that there is an optimum level of paid maternity leave beyond which the gains in health outcomes of children are minimal.

The findings of this study suggest that governments should also provide businesses the time to adjust and comply with the regulation. According to a survey conducted by the Bipartisan Policy Center of businesses with 50 or fewer employees, about half of small business executives stated that it is somewhat or very difficult for their business when employees take leave. They stated that they need some support in providing paid family leave (Shaw, 2019). At the same time, governments should also ensure that there is not a lack of compliance of the regulation. According to Armenia, Gerstel, and Wing (2013), it was estimated that at least 54.3 percent of the firms with 50 or more employees in the U.S. private sector are compliant with the FMLA. Thus, it is likely that more people utilize leave after a couple of years it goes

Table 3
Paid maternity leave.

Variables	(1) Neonatal Mortality	(2) Infant Mortality	(3) Under 5 Mortality	(4) Measles Immunization
Lead Treatment (2 years)	−0.00278 (0.0301)	0.0143 (0.0181)	0.0108 (0.0185)	0.0192 (0.0186)
Lead Treatment (1 year)	−0.00435 (0.0159)	−0.0125 (0.0164)	−0.0117 (0.0153)	−0.00655 (0.00935)
Treatment Year	−0.0114 (0.0211)	−0.0316* (0.0173)	−0.0295 (0.0178)	−0.0171 (0.0261)
Lagged Treatment (1 year)	−0.00752 (0.0119)	−0.00917 (0.0142)	−0.0116 (0.0132)	0.0254 (0.0258)
Lagged Treatment (2 years)	−0.0516*** (0.0169)	−0.0239** (0.00887)	−0.0188** (0.00916)	−0.00569 (0.0173)
GNI (current US dollars)	0 (0)	0** (0)	0*** (0)	0 (0)
Health Expenditure (% of GDP)	−0.0307** (0.0117)	−0.0253** (0.00943)	−0.0256*** (0.00875)	0.00362 (0.00533)
Family Benefits Public Spending (% of GDP)	0.00990 (0.0114)	0.00812 (0.00900)	0.00888 (0.00865)	0.00858 (0.00933)
Prevalence of Anemia Among Pregnant Women (%)	0.0294*** (0.00857)	0.0288*** (0.00625)	0.0283*** (0.00603)	−0.00453 (0.00576)
Female Labor Force Participation Rate	0.00838 (0.0114)	0.0125 (0.0112)	0.0118 (0.0108)	−0.00222 (0.00670)
CO2 Emissions (kt)	4.01e−07 (3.99e−07)	1.75e−07 (2.66e−07)	1.86e−07 (2.54e−07)	1.86e−07 (1.29e−07)
Fixed Telephone Subscription (per 100 people)	5.00e−09* (2.63e−09)	7.21e−10 (2.46e−09)	5.49e−10 (2.25e−09)	−4.97e−10 (1.51e−09)
Individuals Using the Internet (% of the population)	−0.000733 (0.000512)	0.000157 (0.000463)	0.000143 (0.000454)	0.000279 (0.000542)
Total Population	1.41e−08 (1.71e−08)	5.63e−09 (1.08e−08)	3.84e−09 (1.11e−08)	−1.09e−08 (1.76e−08)
Constant	25.32* (13.91)	38.26*** (10.06)	40.06*** (9.653)	−1.784 (8.619)
Observations	723	723	723	722
R-squared	0.992	0.996	0.996	0.849
Country Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Country-Specific Time Trends	YES	YES	YES	YES

Robust standard errors in parentheses.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

into effect and the government strictly enforces the regulation. The delay may also be attributed to the country culture. There may be a social stigma attached to taking time off, particularly for men. As studies have found, the take-up rate is not very high among fathers (Bartel et al., 2018). In Iceland, Portugal, and Sweden, the take-up rate is approximately 45 percent (OECD, 2019). In some countries, such as Denmark and Finland, the take-up rate is as low as about 10 percent (OECD, 2019). This is despite many advocating that paid family leave is not only beneficial for the health of children, it is also beneficial for the health of parents.

When paid family leave is not available, it can contribute to the social and economic costs to the family as well as the society. When mothers return to work less than 12 weeks after giving birth, they are more likely to report stress and depression (Dagher, McGovern, & Dowd, 2014). They experience difficulty in handling the demands of work and family life, and, as a result, many choose to leave their job. This can have a negative impact on the productivity and turnover of the firm (Gault et al., 2014). When employers have to replace employees, it can be costly and time consuming. It is estimated that the average cost to replace an employee is approximately 21 percent of that employee's salary (Boushey, O'Leary, & Glynn, 2013).

Additionally, when parents do not have access to paid family leave, it may exacerbate their physical health conditions (Jou et al., 2018; Peipins, Berkowitz, & White, 2012). Furthermore, co-workers are exposed to infectious diseases, causing them to take time off from work. Similarly, sick children may expose other children to infectious diseases at schools and day care centers. Employees with paid leave are more likely to receive preventive care, which can help reduce health care

costs in the long term (Bartick et al., 2017). According to Bartick et al. (2017), the United States could be saving \$17.2 billions in costs associated with medical expenditures and premature births if mothers were able to exclusively breastfeed for six months. In general, when countries invest more in the health of individuals, it leads to a healthier workforce, which improves the productivity (Martin, Grant, & D'Agostino, 2012).

This study has some limitations. The data does not have information on the number or rate of people that utilize paid maternity leave and paid paternity leave in each country, rather it provides information on the availability of such leave. In other words, it estimates the intent-to-treat effect. It is possible that the treatment-on-the-treated effect is stronger compared to the intent-to-treat effect. This is important, considering access to leave does not necessarily equate to the uptake of leave. For example, in Sweden, about 80 percent of fathers and almost all mothers use parental leave (Marynissen et al., 2019). In contrast, in Belgium, Marynissen et al. (2019) found that only 5.8 percent of Belgian fathers used parental leave in the first two years following the birth of their first child between 2001 and 2010.

The findings of this study are beneficial in understanding the lagged impact of paid family leave, including maternity and paternity leave, on the health outcomes of children. Compared to other studies, the timing of the effect of such leave is of particular significance. This study shows that it takes at least two years for paid family leave to have an effect on the health outcomes of children, indicating that there is a delayed impact after the enactment of paid family leave legislation.

Table 4
Paid paternity leave.

Variables	(1) Neonatal Mortality	(2) Infant Mortality	(3) Under 5 Mortality	(4) Measles Immunization
Lead Treatment (2 years)	−0.00470 (0.0234)	0.000316 (0.0154)	0.00454 (0.0148)	−0.00590 (0.0150)
Lead Treatment (1 year)	0.00148 (0.00609)	−0.00861 (0.00552)	−0.00645 (0.00534)	−0.00997 (0.00809)
Treatment Year	0.0123 (0.0168)	0.00533 (0.00963)	0.00166 (0.00856)	−0.00442 (0.00768)
Lagged Treatment (1 year)	0.00323 (0.00828)	−0.00588 (0.00496)	−0.00132 (0.00489)	−0.00744 (0.00869)
Lagged Treatment (2 years)	−0.0211 (0.0262)	−0.00707 (0.0138)	−0.00803 (0.0141)	0.00420 (0.0100)
GNI (current US dollars)	0 (0)	0 (0)	0 (0)	0 (0)
Health Expenditure (% of GDP)	−0.0292** (0.0123)	−0.0243** (0.00993)	−0.0243** (0.00925)	0.00213 (0.00542)
Family Benefits Public Spending (% of GDP)	0.0105 (0.0111)	0.00860 (0.00898)	0.00914 (0.00856)	0.00943 (0.00920)
Prevalence of Anemia Among Pregnant Women (%)	0.0295*** (0.00933)	0.0293*** (0.00685)	0.0286*** (0.00659)	−0.00385 (0.00567)
Female Labor Force Participation Rate	0.00713 (0.00998)	0.0127 (0.0108)	0.0123 (0.0105)	−0.00214 (0.00638)
CO2 Emissions (kt)	3.48e−07 (3.91e−07)	1.32e−07 (2.60e−07)	1.39e−07 (2.45e−07)	2.17e−07* (1.25e−07)
Fixed Telephone Subscription (per 100 people)	5.05e−09* (2.93e−09)	9.95e−10 (2.61e−09)	6.92e−10 (2.41e−09)	0 (1.56e−09)
Individuals Using the Internet (% of the population)	−0.000868 (0.000564)	0.000108 (0.000493)	8.48e−05 (0.000488)	0.000377 (0.000607)
Total Population	1.15e−08 (1.38e−08)	5.73e−09 (1.03e−08)	2.98e−09 (1.05e−08)	−6.39e−09 (1.51e−08)
Constant	26.04** (11.70)	40.08*** (9.382)	41.96*** (8.868)	−1.614 (7.996)
Observations	723	723	723	722
R-squared	0.992	0.996	0.996	0.850
Country Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Country-Specific Time Trends	YES	YES	YES	YES

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 5
Length of paid maternity leave.

Variables	(1) Infant Mortality	(2) Under 5 Mortality	(3) Measles Immunization	(4) Neonatal Mortality
Length of Paid Maternity Leave	−0.000302 (0.00319)	−0.00133 (0.00200)	−0.00127 (0.00211)	−0.000518 (0.00143)
GNI (current US dollars)	0 (0)	0 (0)	0* (0)	0 (0)
Health Expenditure (% of GDP)	−0.0301** (0.0117)	−0.0243** (0.00973)	−0.0243** (0.00909)	0.00394 (0.00585)
Family Benefits Public Spending (% of GDP)	0.0103 (0.0111)	0.0106 (0.00916)	0.0110 (0.00884)	0.00810 (0.00948)
Prevalence of Anemia Among Pregnant Women (%)	0.0295*** (0.00776)	0.0305*** (0.00560)	0.0297*** (0.00539)	−0.00455 (0.00509)
Female Labor Force Participation Rate	0.00927 (0.0113)	0.0145 (0.0109)	0.0131 (0.0105)	−0.00110 (0.00764)
CO2 Emissions (kt)	2.69e−07 (4.08e−07)	1.90e−07 (2.88e−07)	1.89e−07 (2.75e−07)	2.26e−07* (1.33e−07)
Fixed Telephone Subscription (per 100 people)	4.87e−09* (2.72e−09)	6.71e−10 (2.61e−09)	4.00e−10 (2.39e−09)	−7.09e−10 (1.70e−09)
Individuals Using the Internet (% of the population)	−0.000798 (0.000536)	0.000176 (0.000455)	0.000164 (0.000450)	0.000406 (0.000497)
Total Population	1.94e−08 (1.34e−08)	5.28e−09 (9.61e−09)	3.33e−09 (9.08e−09)	4.32e−10 (1.70e−08)
Constant	27.97** (11.25)	40.50*** (8.864)	41.93*** (8.111)	4.599 (8.616)
Observations	764	764	764	761
R-squared	0.992	0.996	0.996	0.859
Country Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Country-Specific Time Trends	YES	YES	YES	YES

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 6
Length of paid paternity leave.

Variables	(1) Infant Mortality	(2) Under 5 Mortality	(3) Measles Immunization	(4) Neonatal Mortality
Length of Paid Paternity Leave	−0.0109 (0.00994)	−0.00931* (0.00521)	−0.00808* (0.00476)	−0.00892 (0.00543)
GNI (current US dollars)	−0 (0)	0 (0)	0 (0)	0 (0)
Health Expenditure (% of GDP)	−0.0307** (0.0119)	−0.0247** (0.00995)	−0.0247** (0.00930)	0.00340 (0.00583)
Family Benefits Public Spending (% of GDP)	0.0109 (0.0108)	0.0104 (0.00889)	0.0108 (0.00855)	0.00841 (0.00951)
Prevalence of Anemia Among Pregnant Women (%)	0.0298*** (0.00796)	0.0306*** (0.00570)	0.0297*** (0.00547)	−0.00433 (0.00517)
Female Labor Force Participation Rate	0.00993 (0.0116)	0.0154 (0.0111)	0.0139 (0.0107)	−0.000441 (0.00738)
CO2 Emissions (kt)	2.76e−07 (4.07e−07)	1.82e−07 (2.79e−07)	1.81e−07 (2.66e−07)	2.28e−07* (1.35e−07)
Fixed Telephone Subscription (per 100 people)	5.17e−09* (2.74e−09)	9.50e−10 (2.62e−09)	6.44e−10 (2.40e−09)	−4.50e−10 (1.71e−09)
Individuals Using the Internet (% of the population)	−0.000744 (0.000504)	0.000182 (0.000448)	0.000165 (0.000444)	0.000441 (0.000506)
Total Population	2.23e−08* (1.21e−08)	7.44e−09 (9.85e−09)	5.16e−09 (9.20e−09)	2.78e−09 (1.70e−08)
Constant	29.42** (11.00)	42.44*** (9.104)	43.69*** (8.378)	5.967 (8.294)
Observations	764	764	764	761
R-squared	0.992	0.996	0.996	0.860
Country Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Country-Specific Time Trends	YES	YES	YES	YES

9. Conclusions

The impact of paid family leave on the outcome of the health of children in 35 OECD countries has been examined. The study includes both maternity leave, which has been in place for many years, and paternity leave, which is a relatively new extension of paid family leave. The health outcomes of children included in the study are neonatal mortality rates, infant mortality rates, under-five mortality rates, and the measles immunization rates. Data during the time period of 1990 to 2016 was analyzed using a two-way fixed effects model.

A significant decrease in the infant, neonatal, and under-five mortality rates was found. Paid maternity leave was associated with a 5.2 percent decrease in the neonatal mortality rate, a 2.4 percent decrease in the infant mortality rate, and 1.9 percent decrease in the under-five mortality rate after two years of its adoption. However, the impact of paid paternity leave was not as visible as that of paid maternity leave, which may be attributed to its recency and amount that is much smaller than that of the more common maternity leave.

This study provides justification for a national paid family leave law in the United States, at the federal level, particularly in the light of the on-going Coronavirus (COVID-19) pandemic. In December 2019, Federal Employee Paid Leave Act was enacted, which covers federal employees. In March 2020, Families First Coronavirus Response Act was enacted, which covers those affected by COVID-19. These laws cover certain groups and certain situations, and now the need is for a law that can serve the entire workforce.

Declaration of Competing Interest

The author does not have any conflict of interest related to the submission and publication of this article.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.chilcyouth.2020.105259>.

References

- Allen, S., & Daly, K. (2007). *The effects of father involvement: An updated research summary of the evidence*. Centre for Families. Work & Well-Being, University of Guelph.
- Appelbaum, E., & Milkman, R. (2011). Leaves that pay: Employer and worker experiences with paid family leave in California. UCLA Institute for Research on Labor and Employment.
- Armenia, A., Gerstel, N., & Wing, C. (2013). Workplace compliance with the law: The case of the family and medical leave act. *Work and Occupations*, 41(3), 277–304.
- Baker, M., Gruber, J., & Milligan, K. (2008). Universal child care, maternal labor supply, and family well-being. *Journal of Political Economy*, 116(4), 709–745.
- Bratberg, E., & Naz, G. (2009). Does paternity leave affect mothers' sickness absence? Working Papers in Economics 06/09, Department of Economics, University of Bergen, Bergen, Norway.
- Bartel, A. P., Rossin-Slater, M., Ruhm, C. J., Stearns, J., & Waldfogel, J. (2018). Paid family leave, fathers' leave-taking, and leave-sharing in dual-earner households. *Journal of Policy Analysis and Management*, 37(1), 10–37.
- Bartick, M. C., Schwarz, E. B., Green, B. D., Jegier, B. J., Reinhold, A. G., Colaizy, T. T., & Stuebe, A. M. (2017). Suboptimal breastfeeding in the United States: Maternal and pediatric health outcomes and costs. *Maternal and Child Nutrition*, 13(1), Article e12366.
- Baum, C. L., & Ruhm, C. J. (2016). The effects of paid family leave in California on labor market outcomes. *Journal of Policy Analysis and Management*, 35(2), 333–356.
- Berger, L. M., & Waldfogel, J. (2004). Maternity leave and the employment of new mothers in the United States. *Journal of Population Economics*, 17(2), 331–349.
- Berger, L. M., Hill, J. L., & Waldfogel, J. (2005). Maternity leave, early maternal employment and child health and development in the US. *The Economic Journal*, 115(501), Article 29.
- Bernal, R. (2008). The effect of maternal employment and child care on children's cognitive development. *International Economic Review*, 49(4), 1173–1209.
- Boushey, H., O'Leary, A., & Glynn, S. J. (2013). Our working nation in 2013: An updated national agenda for work and family policies. Center for American Progress, Washington DC.
- Chatterji, P., & Markowitz, S. (2012). Family leave after childbirth and the mental health of new mothers. *Journal of Mental Health Policy and Economics*, 15(2), 61–76.
- Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., Trikalinos, T., & Lau, J. (2007). *Breastfeeding and maternal and infant health outcomes in developed countries. Evidence/Report/Technol Assessment 153, Report Prepared for the Agency for Health Care Research and Quality*. Rockville, Maryland: U.S. Department of Health and Human Services.
- Clemans-Cope, L., Perry, C. D., Kenney, G. M., Pelletier, J. E., & Pantell, M. S. (2008). Access to and use of paid sick leave among low-income families with children. *Pediatrics*, 122, e480–e486.
- Cools, S., Fiva, J. H., & Kirkeboen, L. J. (2015). Causal effects of paternity leave on children and parents. *The Scandinavian Journal of Economics*, 117(3), 801–828.
- Dagher, R. K., McGovern, P. M., & Dowd, B. E. (2014). Maternity leave duration and postpartum mental and physical health: Implications for leave policies. *Journal of Health Politics, Policy and Law*, 39(2), 369–416.

- Daku, M., Raub, A., & Heymann, J. (2012). Maternal leave policies and vaccination coverage: A global analysis. *Social Science & Medicine*, 74(2), 120–124.
- Gault, B., Hartmann, H., Hegewisch, A., Milli, J., & Reichlin, L. (2014). *Paid parental leave in the United States: What the data tell us about access, usage, and economic and health benefits*. Washington DC: Institute for Women's Policy Research.
- Glinianaia, S. V., Rankin, J., Bell, R., Mulloli, T. P., & Howel, D. (2004). Does particulate air pollution contribute to infant death? A systematic review. *Environmental health perspectives*, 112(14), 1365–1370.
- Goodman-Bacon, A. (2018). *Difference-in-differences with variation in treatment timing*. Working Paper No. 25018. Washington DC: National Bureau of Economic Research.
- Gupta, N., Smith, N., & Verner, M. (2008). Child care and parental leave in the Nordic countries: A model to aspire to? *Review of Economics of the Household*, 6, 65–89.
- Haas, L., & Hwang, C. P. (2008). The impact of taking parental leave on fathers' participation in childcare and relationships with children: Lessons from Sweden. *Community, Work and Family*, 11(1), 85–104.
- Hamdan, A., & Tamim, H. (2012). The relationship between postpartum depression and breastfeeding. *The International Journal of Psychiatry in Medicine*, 43(3), 243–259.
- Heymann, J., Sprague, A. R., Nandi, A., Earle, A., Batra, P., Schickedanz, A., ... Raub, A. (2017). Paid parental leave and family wellbeing in the sustainable development era. *Public Health Reviews*, 38(21).
- Hewitt, B., Strazdins, L., & Martin, B. (2017). The benefits of paid maternity leave for mothers' post-partum health and wellbeing: Evidence from an Australian evaluation. *Social Science & Medicine*, 182, 97–105.
- Jou, J., Kozhimannil, K. B., Abraham, J. M., Blewett, L. A., & McGovern, P. M. (2018). Paid maternity leave in the United States: Associations with maternal and infant health. *Maternal and Child Health Journal*, 22(2), 216–225.
- Kavanaugh, K., Meier, P., Zimmermann, B., & Mead, L. (1997). The rewards outweigh the efforts: Breastfeeding outcomes for mothers of preterm infants. *Journal of Human Lactation*, 13(1), 15–21.
- Lester, G. (2005). A defense of paid family leave. *Harvard Journal of Law and Gender*, 28(1).
- Lichtman-Sadot, S., & Bell, N. P. (2017). Child health in elementary school following California's paid family leave program. *Journal of Policy Analysis and Management*, 36(4), 790–827.
- Mandal, B. (2018). The effect of paid leave on maternal mental health. *Maternal and Child Health Journal*, 22(6), 1470–1476.
- Marshall, K. (2008). *Fathers' use of paid parental leave. Perspectives*, Statistics Canada.
- Martin, G., Grant, A., & D'Agostino, M. (2012). Global Health Funding and Economic Development. *Global Health*, 8, 8.
- Martínez-Fernández, A., Lobos-Medina, I., Díaz-Molina, C. A., Chen-Cruz, M. F., & Prieto-Egido, I. (2015). TulaSalud: An m-health system for maternal and infant mortality reduction in Guatemala. *Journal of Telemedicine and Telecare*, 21(5), 283–291.
- Marynissen, L., Mussino, E., Wood, J., & Duvander, A.-Z. (2019). Fathers' Parental Leave Uptake in Belgium and Sweden: Self-Evident or Subject to Employment Characteristics? *Social Sciences*, 8(11), 312.
- Moon, R. Y., Patel, K. M., & McDermott-Shaefer, S. J. (2000). Sudden infant death syndrome in child care settings. *Pediatrics*, 106(2), 295–300.
- Moon, R. Y., Sprague, B. M., & Patel, K. M. (2005). Stable prevalence but changing risk factors for sudden infant death syndrome in child care settings in 2001. *Pediatrics*, 116(4), 972–977.
- National Prevention Council, 2011. National prevention strategy. National Prevention Council, U.S. Department of Health and Human Services, Office of the Surgeon General, Washington DC.
- OECD Family Database, 2019. PF2.1: Parental Leave Systems.
- Pac, J. E., Bartel, A. P., Ruhm, C. J., & Waldfogel, J. (2019). Paid family leave and breastfeeding: Evidence from California. Working Paper No. 25784. Washington DC: National Bureau of Economic Research.
- Pedersen, F. A., Rubenstein, J. L., & Yarrow, L. J. (1979). Infant development in father-absent families. *The Journal of Genetic Psychology*, 135(1), 51–61.
- Peipins, L. A., Soman, A., Berkowitz, Z., & White, M. C. (2012). The lack of paid sick leave as a barrier to cancer screening and medical care-seeking: Results from the National Health Interview Survey. *BMC Public Health*, 12(520).
- Persson, P., & Rossin-Slater, M. (2019). *When Dad Can Stay Home: Fathers' Workplace Flexibility and Maternal Health*. Discussion Paper No. 12386. Bonn, Germany: IZA Institute of Labor Economics.
- Shonkoff, J. P., & Phillips, D. A. (Eds.). (2000). *From neurons to neighborhoods: The science of early childhood development*. Washington DC: The National Academies Press.
- Rossin-Slater, M., Ruhm, C. J., & Waldfogel, J. (2013). The effects of California's paid family leave program on mothers' leave-taking and subsequent labor market outcomes. *Journal of Policy Analysis and Management*, 32(2), 224–245.
- Ruhm, C. J. (2000). Parental leave and child health. *Journal of Health Economics*, 19(6), 931–960.
- Schulte, B., Durana, A., Stout, B., & Moyer, J. (2017). *Paid family leave: How much time is enough?* Washington, DC: New America.
- Schuster, M. A., Chung, P. J., Elliott, M. N., Garfield, C. F., Vestal, K. D., & Klein, D. J. (2008). Awareness and use of California's paid family leave insurance among parents of chronically ill children. *JAMA*, 300(9), 1047–1055.
- Shaw, T. (2019). Key takeaways from BPC's survey of small business views on paid family leave. Bipartisan Policy Center, Washington DC.
- Sole-Smith, V. (2016). One unassailable reason we need paid family leave: It saves babies lives. *Slate Magazine*.
- Solon, G., Haider, S. J., & Wooldridge, J. M. (2015). What are we weighting for? *Journal of Human Resources*, 50(2), 301–316.
- Stanczyk, A. B. (2019). Does paid family leave improve household economic security following a birth? Evidence from California. *Social Service Review*, 93(2), 262–304.
- Summers, L. H. (1989). Some simple economics of mandated benefits. *The American Economic Review*, 79(2), 177–183.
- Sundström, M., & Stafford, F. P. (1992). Female labour force participation, fertility and public policy in Sweden. *European Journal of Population / Revue Européenne de Démographie*, 8(3), 199–215.
- Tanaka, S. (2005). Parental leave and child health across OECD countries. *The Economic Journal*, 115(501), F7–F28.
- Tanaka, S., & Waldfogel, J. (2007). Effects of Parental leave and work hours on fathers' involvement with their babies: Evidence from the millennium cohort study. *Community, Work and Family*, 10(4), 409–426.
- Tikotzky, L., Sadeh, A., Volkovich, E., Manber, R., Meiri, G., & Shahar, G. (2015). VII. Infant sleep development from 3 to 6 months postpartum: Links with maternal sleep and paternal involvement. *Monographs of the Society for Research in Child Development*, 80(1), 107–124.
- Winegarden, C. R., & Bracy, P. M. (1995). Demographic consequences of maternal-leave programs in industrial countries: Evidence from fixed-effects models. *Southern Economic Journal*, 61(4), 1020–1035.
- World Health Organization (2019). *Newborns: Reducing mortality*. Geneva, Switzerland: World Health Organization.